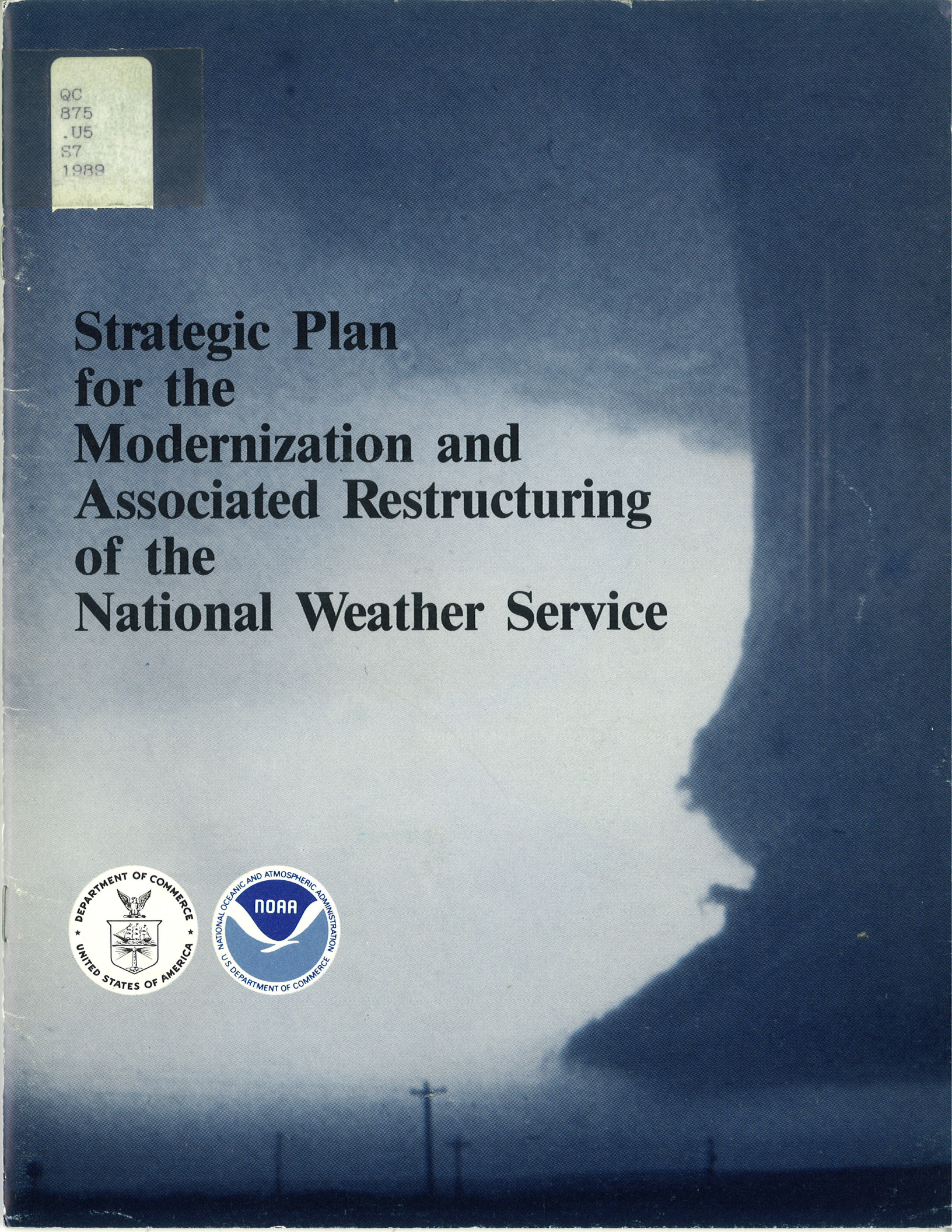
Strategic Plan for the Modernization and Associated Restructuring of the National Weather Service



Cover photograph compliments of the National Center for Atmospheric Research Field Observing Facility

The right side of the photograph shows the main storm tower of a rotating thunderstorm near Limon, Colorado on June 12, 1984. The shelf cloud can be seen on the inflow side of the storm at the bottom left side of the tower. This thunderstorm later produced several tornados.

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Introduction

Weather pervades and affects the daily life of each American. Since the beginning of the Republic, a strong scientific tradition of meteorological research and service has existed in the United States. At a national, regional, and local scale, weather affects the Nation's agriculture, water resources, transportation, general economy, and public safety. Accurate information about future atmospheric events is key to mitigating any adverse effects of the weather. Federal agencies have long joined in cooperative efforts to collect, share, and effectively use weather data and information for the public good. Applied research conducted over the last ten years in the National Oceanic and Atmospheric Administration's (NOAA) Environmental Research Laboratories in New Jersey, Colorado and Oklahoma, and other Federal laboratories such as the National Center for Atmospheric Research has demonstrated that state-of-the-art laboratory techniques for analyzing and predicting severe weather and flood phenomena can be practicably applied to Weather Service operations. Because the scientific understanding of the atmosphere and the ability to forecast large and small-scale weather phenomena has increased dramatically over the last two decades, the Department of Commerce has set an ambitious goal for the National Oceanic and Atmospheric Administration's agency, the National Weather Service (NWS):

To modernize the NWS through the deployment of proven observational, information processing and communications technologies, and to establish an associated cost effective operational structure. The modernization and associated restructuring of NWS shall assure that the major advances which have been made in our ability to observe and understand the atmosphere are applied to the practical problems of providing weather and hydrologic services to the Nation.

Implementation and practice of the new science will achieve more uniform weather services across the Nation, improve forecasts, provide more reliable detection and prediction of severe weather and

flooding, permit a more cost effective NWS, and achieve higher productivity for NWS employees. The effort to improve weather warnings and forecasts will be guided by the principle of providing high quality weather services to users while concurrently lowering NWS operating costs. The development of new technologies will be guided by the principle of balancing technical and service improvements with overall costs. All changes proposed by the NWS will allow productivity and efficiency for any entity dependent on weather information. This includes local, state, and Federal government agencies, private sector meteorologists, private industry, and resource management organizations.

In 1988, Public Law 100-685 was signed by the President which, in part, specifies conditions on the planning, reporting and accomplishment of the modernization and associated restructuring of the NWS. This Strategic Plan is the first response to the Congress required by Public Law 100-685. The Federal law requires an identification of the basic service improvement objectives of the modernization, the pivotal new technological components, and the associated operational changes required to fulfill the objectives of weather and flood warning improvements. Plans, resources, schedules, etc. will be contained in the second, and subsequently annual report required by the Congress—the National Implementation Plan.

Principles for the Modernization and Associated Restructuring

The Modernization and Associated Restructuring goal will require significant changes in the current weather service infrastructure and operations. Accordingly, the following principles will guide the planning and implementation.

Throughout the process of change, the **NWS is committed to its mission** which is *to provide weather and flood warnings, public forecasts and advisories for all of the United States, its territories, adjacent waters and ocean areas, primarily for the protection of life and property. NWS data and products are provided to private meteorologists for the provision of all specialized services.* The following principles are essential to meet the operational mission and will be continued during the modernization and associated restructuring transition period.

The principle that the modernization and associated restructuring process will not result in the degradation of services to the general

public. Also, service and structural changes and improvements will be implemented only when certified in accordance with Public Law 100–685 to be beneficial to users.

The principle that NWS employees will be involved because their participation is crucial to a successful transition and improved operations. Significant levels of training and education will be provided so that employees will gain the necessary expertise to utilize the new technologies, understand the new sciences underpinning the modernization and associated restructuring and provide the improved services to the Nation. The changes will provide exciting opportunities for professional growth.

The principle that United States international meteorological and hydrologic obligations will be met during and after the modernization and associated restructuring. The exchange of global atmospheric data is essential to the successful interpretation and forecast of weather phenomena in the United States. The NWS is a partner supporting national security interests on a global basis.

The principle that NWS employees will continue to provide the quality weather services required by the country in the most economical manner.

The Need To Implement New Science and Technology

A weather service organization, whether private or public, fulfills fundamental public safety and economic needs. The information provided supports life-saving and economic productivity decisions. For example, hurricane evacuation recommendations and airline routing decisions are heavily dependent on weather forecasts. As a Nation, the United States experiences more severe local storms and flooding than any other in the world. Eighty-five percent of all presidentially declared disasters result from severe weather events. In a typical year, the United States can expect a staggering assault by the elements: some 10,000 violent thunderstorms, 5,000 floods, 1,000 tornados, and several hurricanes. Along with periods of severe drought, hard winters, and heat waves, these events translate into considerable loss of life and annual property damages estimated in billions of dollars.

The most deadly of our Nation's weather events—tornados, severe thunderstorms, and flash floods—are also the most difficult to detect

and forecast. They form and exist at the small atmospheric scale (mesoscale) and are measured in minutes and tens of miles. Most mesoscale phenomena are well below the operational resolution of routine observations and analysis today. However, prototype observing technologies and information processing systems, when made available to research meteorologists have provided the first observations of, and insights into the formative indicators of dynamic mesoscale processes of the atmosphere. When implemented operationally, these systems and associated science will improve all weather forecasts provided by national meteorological centers and weather forecast offices. These new systems will enable earlier detection and permit the short range prediction of destructive, violent, local storms and floods, thereby mitigating a glaring shortfall in current warning services. The new observational technologies planned for the next decade will provide unprecedented amounts of complex information and data, requiring significantly higher levels of analytical and interpretive skills by the operational forecasters.

To realize the gains from this research and technology, the Nation needs to put the new meteorological science into practice. This will require training personnel and the deployment of proven, new observational, information processing, and communications technologies.

At present, the vintage technologies that compose part of today's weather service infrastructure need to be replaced. As the equipment has aged, it has become costly to maintain. By replacing the equipment with more reliable technologies that support the new scientific capabilities, the Nation can move into the twenty-first century with strengthened confidence in its atmospheric prediction capabilities.

The Need To Implement New Technology

The Technological Opportunity

Major Technologies for Modernization

New technological systems are essential in providing the opportunity to improve warning and forecast services and for replacing obsolete and increasingly unreliable existing systems. Each of the new technologies plays a unique, but complementary role in the modernization process. The information provided by the new observational technologies will yield high resolution, time variant, three-dimensional representations of details on the state of the atmosphere. At Weather Forecast Offices, intended to perform warning and forecast services, advanced weather data processing systems will aid the forecaster in the assimilation of changing data and numerical weather prediction products. The meteorologist and hydrologist will be able to rapidly manipulate, display and analyze information, thus enabling them to combine scientific principles and operational experience to produce more accurate and timely warning and forecast services for the Nation. The new high-resolution data sets and derived information are an important input to business and economic decision making outside the NWS.

Numerous Federal agencies have long shared in the observation and exchange of hydrometeorological data. The existing national observing networks are sparse and limited in their coverage of the Nation's atmosphere. The NWS is joined in its acquisition of much of the major new technologies by the Department of Transportation's Federal Aviation Administration and the Department of Defense, which results in economies of scale and a reduction in purchase costs. The geographical placement of the new radars and automated surface observing systems is coordinated by the three agencies thereby providing more uniform national coverage by these land-based systems. The new geostationary meteorological satellites being procured by NOAA complement the new radars and automated surface observing systems with blanket coverage of the conterminous states. Data from these new observing systems will be shared by each participating agency and will be available in summary form throughout the Nation.

Automated Surface Observing System (ASOS)

Automating surface observations will relieve staff from the manual collection of surface observations. Over 1000 ASOS systems across the Nation will be providing data on pressure, temperature, wind direction and speed, runway visibility, cloud ceiling heights, and type and intensity of precipitation on a nearly continuous basis. The 1000 ASOS sites include approximately 750 airport installations under the jurisdiction of the Federal Aviation Administration and approximately 250 NWS sites. The Department of Defense is also considering the acquisition of additional units. The observational data provided by the ASOS system supports aviation operations and provides meteorological data needed by severe weather, flash flood, and river flood forecasting programs. The national capability to observe and transmit critical changing weather conditions almost as they occur represents an important enhancement for improving warning and forecast services.

Next Generation Weather Radars (NEXRAD)

Utilizing Doppler radar technology, the NEXRAD system will observe the presence and calculate the speed and direction of motion of severe weather elements such as tornados and violent thunderstorms. NEXRAD will also provide quantitative area precipitation measurements so important in hydrologic forecasting of potential flooding. The severe weather and motion detection capabilities offered by NEXRAD will contribute toward an increase in the accuracy and timeliness of NWS warning services. At present, for example, due to the limitation in the current radar detection systems, tornado warnings are usually issued only when visual sightings have been reported. The advent of NEXRAD will not only allow for an earlier detection of the precursors to tornadic activity, but will also provide data on the direction and speed of tornado cells once they form. The national network of 160 NEXRAD systems provides a significant improvement in uniform coverage over the present day radar network. The NWS plans to operate 121 NEXRAD systems; the remainder of the NEXRAD systems will be located at Federal Aviation Administration and Department of Defense locations.

Satellite Upgrades

For severe weather and flood warnings and short range forecasts, cloud imagery and atmospheric sounding data from the geostationary meteorological satellites will continue to be a major data source. The new Geostationary Operational Environmental Satellite (GOES)

I–M system will have separate instrumentation that allows simultaneous image and sounding data to be observed and transmitted to ground stations. The GOES I–M system will also provide visible and infrared imagery data updates as frequently as every six minutes during severe weather warning situations over selected areas of the United States.

For longer-range forecasting, soundings from the polar orbiting satellites are a primary data input into the National Meteorological Center numerical forecast models. The Advanced Microwave Sounding Unit, to be flown on the NOAA K–M satellite series, will provide global soundings in cloudy regions at nearly the same level of accuracy as those presently produced in cloud free areas.

National Center Advanced Computer Systems

Warnings and forecasts prepared by NWS offices in the next decade will rely heavily on the basic analyses and guidance products provided by the National Meteorological Center, especially for periods of 36 hours and beyond. These analyses and guidance products result from numerical models of the atmosphere run on high-speed computers. The future requirement for guidance products for mesoscale warnings and forecasts is greatly increased over the present. Fundamental model improvements are necessary to satisfy these requirements and provide guidance products of sufficient quality and frequency to support the warning and forecast operation at each office. Present day Class VI computers do not possess sufficient capacity to support the improvements needed at the National Centers. These increased demands require the acquisition of dedicated next generation Class VII computer capabilities with a processing capability an order of magnitude greater than the present Class VI computer.

Advanced Weather Interactive Processing System (AWIPS)

The revised AWIPS system will be the nerve center of the operations. AWIPS will be the data integrator receiving the high-resolution data from the observation systems, the centrally collected data and the centrally prepared analysis and guidance products from the National Meteorological Center. The integration of all of this data from multiple sources represents the information base from which all warning and forecast products will be prepared. The AWIPS system will provide fast-response interactive analysis and display of the

data to help support the meteorologist make rapid decisions, prepare warnings and forecasts, and disseminate products to users.

AWIPS includes the communications network that inter-connects each Weather Forecast Office for exchange of locally generated data. NOAAPORT will provide communications support for the operational distribution of the centrally collected data and centrally produced analysis and guidance products, as well as the satellite imagery and sounding data processed by the National Environmental Satellite, Data and Information Service. In addition to supporting the requirement for AWIPS point to multi-point communications, NOAAPORT will also deliver a wide range of NOAA products, such as oceanographic and environmental data to external users including other government agencies, universities, private research organizations, and business interests.

The Need To Restructure

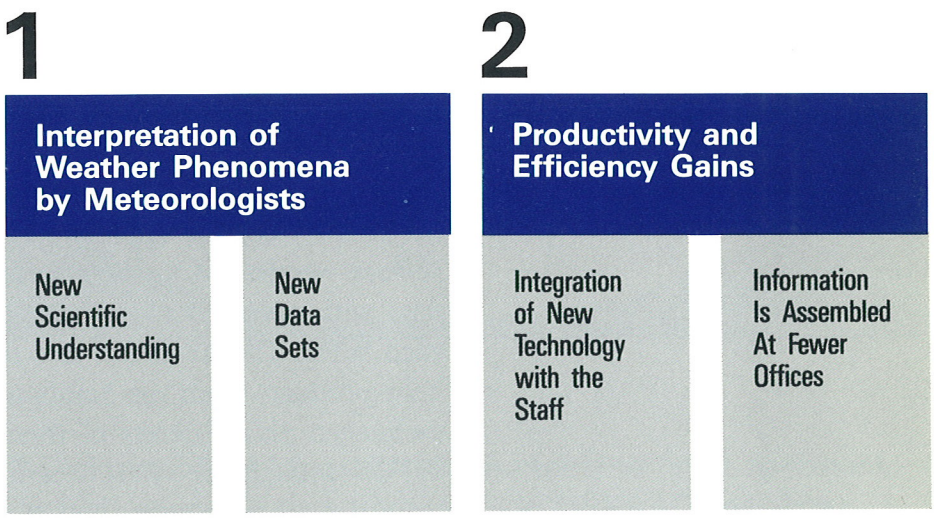
The planned restructuring involves changing the number and location of field offices in a manner responsive to certification conditions imposed by Public Law 100–685, a gradual transformation of the workforce to one more professional in its makeup, and a reallocation of operational responsibilities between field offices and the National Centers.

The effective use of the advanced technologies planned for the NWS is closely linked to the scientific abilities of NWS personnel and the national field office structure. The current field office structure has evolved intermittently throughout the agency's history. Today, the structure supports a labor intensive observation and dissemination network. If the new technological network were constrained by the current field office structure, required staffing levels and overall costs would increase unnecessarily.

The need to restructure is twofold: first, the combination of new operational concepts, new data sets, and an evolving scientific understanding of the dynamic processes associated with the most dangerous weather phenomena requires an increase in the number of meteorologists. During periods of impending severe weather and flooding, operational personnel are under extreme pressure to make timely and accurate decisions. The percentage increase of meteorologists in the NWS workforce will improve warnings and forecasts by taking advantage of the capabilities of the new technologies. Second,

productivity and efficiency gains will occur as a result of increased integration of the new technological observation, information processing and communication systems with the staff. An increased effective range of the radar systems and the ability to assemble all data at a reduced number of offices increases productivity and efficiency. The reduced number of offices places a special emphasis on the effective delivery of weather services to communities.

Key tradeoffs in the restructuring process exist between human capabilities, costs, and programmatic, scientific, and technological opportunities. Factors considered in determining restructuring and ultimately the quality of warning and forecast services include the ability to establish a more uniform observational network across the country, the automation of observational duties, orographic (effects of mountains) characteristics, the ability of the NWS workforce to employ and understand new technologies and science, and so on.



The Need To Restructure is Twofold

The National Weather Service in the 1990s

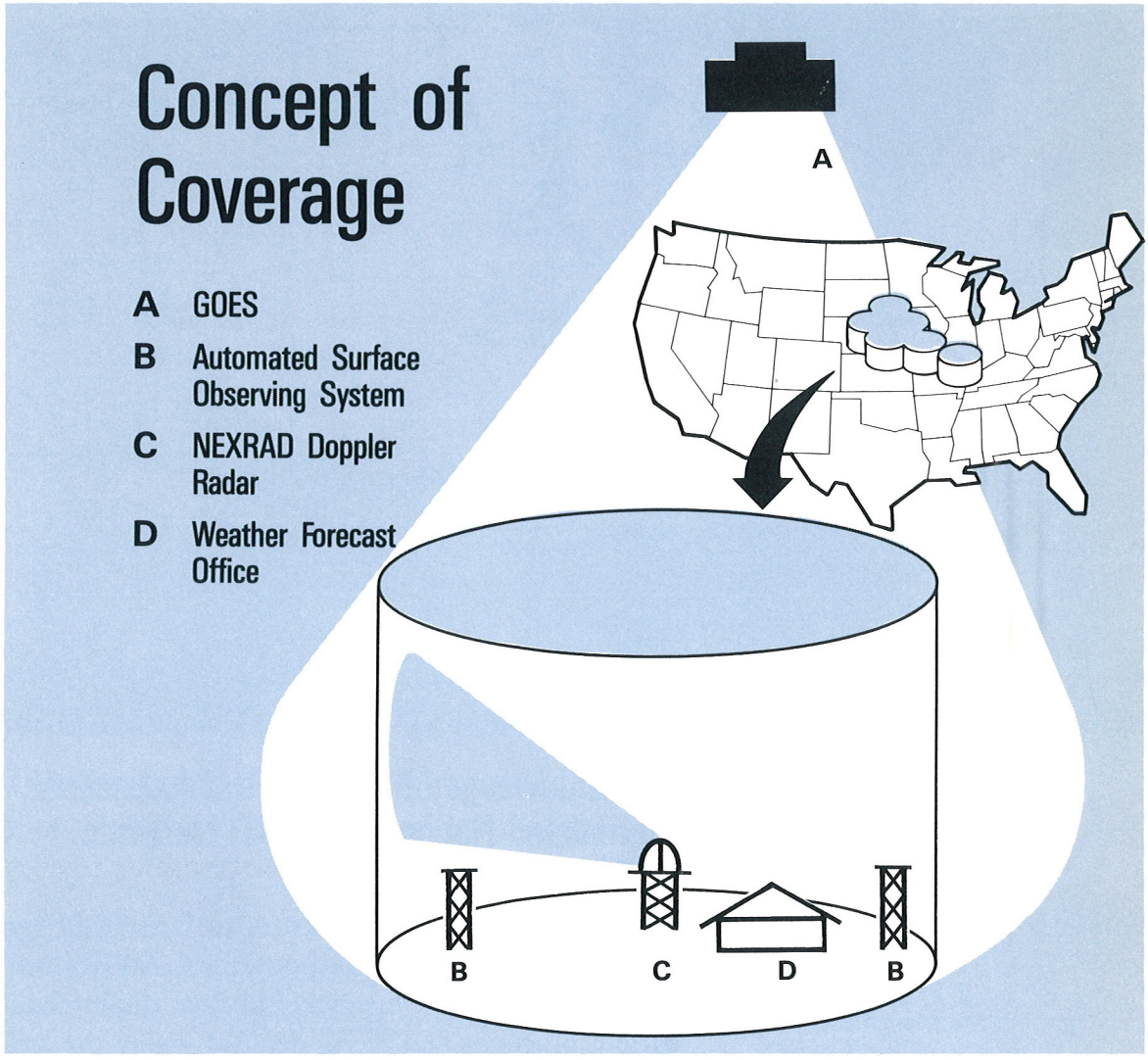
The Weather Forecast Office (WFO) Area of Responsibility

A conceptual analogy of the area of responsibility of a WFO can be portrayed as follows: on the surface of a map of the United States consider a uniform arrangement of 115 conterminous cylinders, each with a radius of approximately 125 miles, extending from the earth's surface up through the atmosphere. The volume of space contained within each cylinder represents the "area" of operational responsibility associated with the WFO. A WFO is located in the center of the base of the cylinder. Each section of the country and the coastal ocean is contained in one of these cylinders and the whole of the country is theoretically uniformly covered.

The GOES Satellite positioned over the United States is providing uniform coverage with visible and infrared imagery and remote soundings penetrating each cylinder from above. Associated with each WFO is one or more NEXRAD radars which scan the atmosphere from near the earth's surface to a height sufficient to detect the majority of meteorological events. Across the surface of the country are the approximately 1000 ASOS units each measuring surface weather parameters as fast as every minute. All of these data within the cylinder are sent directly to the AWIPS system in each WFO. The AWIPS is also receiving the centrally produced guidance products from the National Centers generated from globally exchanged data. Subsets of these data sets are available to all other WFOs through the AWIPS communication network.

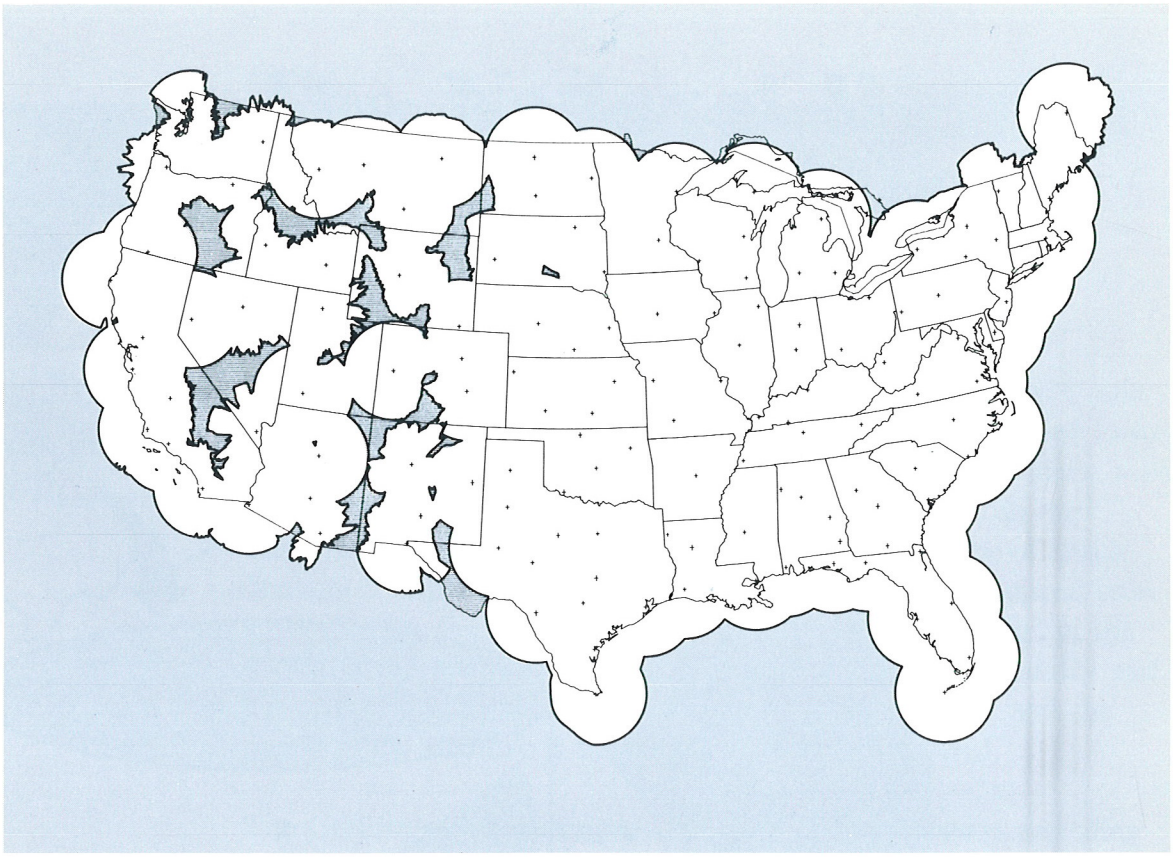
Integrated Operations Within the WFO

The future operations will allow forecasters to comprehensively address the air-sea environment in their assigned area. The observation and analysis of current and expected weather conditions can be quickly and reliably completed, critical decisions made, and translated into immediate warnings and forecasts. This is contrasted to current operations where a number of meteorologists and technicians are required to individually evaluate a limited data base and separately derive the required variety of warnings and forecasts.



The concept of the local data base is central to future operations. The high volume of data from the local NEXRAD and geostationary meteorological satellites combined with the high frequency observations from ASOS will flow directly to the Weather Forecast Office. The most complete data sets will only be available to the local WFO. However, summarized data from all NEXRADs and ASOSs in the Nation will be made available to all field offices.

The new observing systems are designed to provide data sets which can be immediately integrated into three dimensional depictions of the rapidly changing state of the environment. Each system will contribute a critical part, combining with and complementing data from all other systems to form a complete set of information

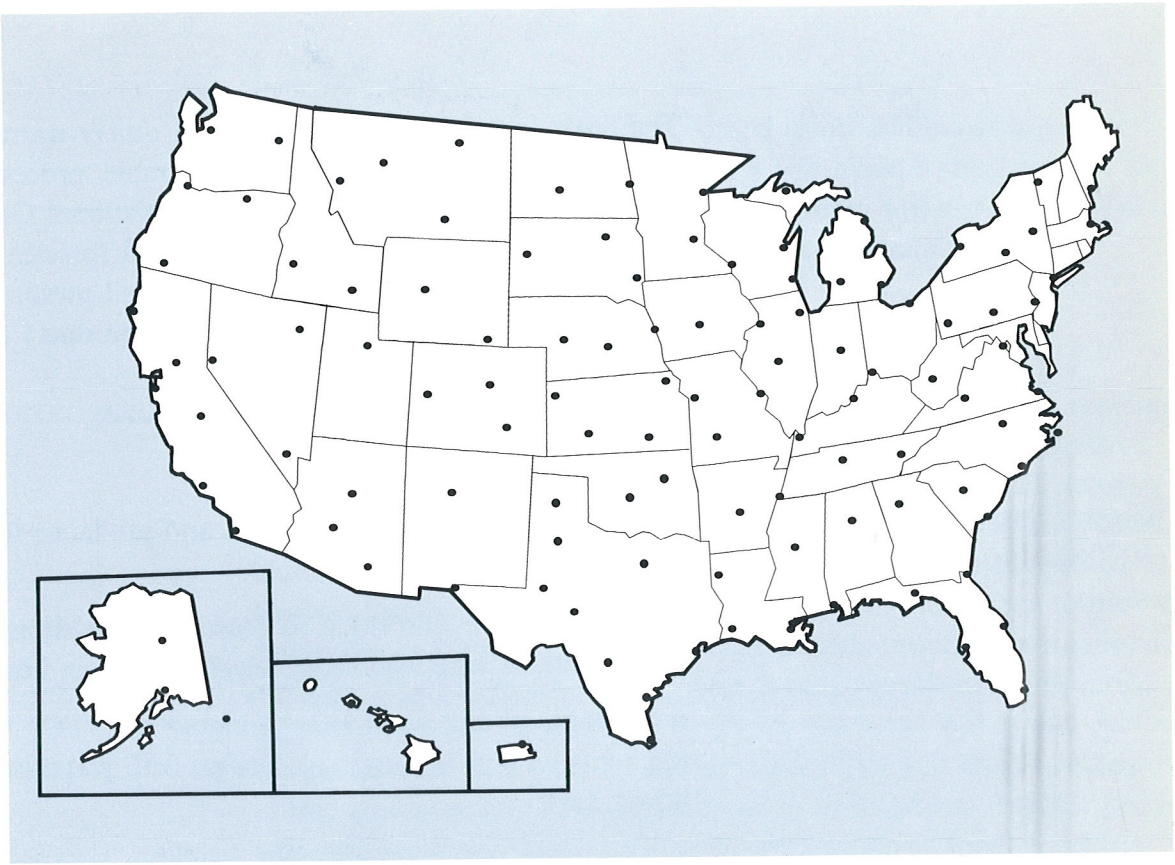


Depiction of the Total Coverage (at 10,000 Ft. Elevation) Provided by the Completed National NEXRAD Network.

about the space from the earth's surface to the upper atmosphere over the WFO's area of responsibility. AWIPS work stations will allow the forecaster to quickly update, quality control, and analyze current processes and events detailed within the area of concern. New dedicated supercomputer capabilities and high resolution models running at the National Centers will provide a stream of detailed, frequently updated guidance to forecasters, assisting in the prediction of future conditions. This represents a new, highly integrated mode of operation which greatly increases the productivity of personnel, and also holds the promise of increased accuracy and greater timeliness of forecast services for the Nation.

The New Structure

The WFO will be the future weather office that will provide all warning and forecast services for its assigned area of responsibility. The forecast and warnings operations at the WFO are supported by guidance products issued from the National Centers and RFCs.



Locations of the Weather Forecast Offices

Weather Forecast Offices (WFOs)

A total of 115 WFOs will exist in the future that will provide weather and hydrologic services in four major areas:

- Watches and warnings for the general public for severe local storms, floods, flash floods and winter storms. Local and zone public forecasts, and fire weather forecasts;
- Local aviation watches and warnings, terminal forecasts, and domestic aviation enroute forecasts;
- Marine warnings and forecasts for coastal areas of the Nation and the Great Lakes; and
- Hydrologic services which identify flash flood-prone areas and the development of community supported surveillance systems.

The foundation for the more accurate and timely warnings and forecasts will be the guidance products from the National Centers and RFCs and the data from the new observing systems: ASOS, NEXRAD, and geostationary meteorological satellites. They will provide the unique local data base which depicts the environment in the WFO's area of responsibility.

The basic tool for more accurate and timely warnings and forecasts from the WFO is AWIPS. It will assemble, process and display the observational data and guidance from National Centers. AWIPS will help meteorologists with the warning and forecast decision process through an interactive work station. It will preformat warning and forecast products and disseminate these products to the users in a timely manner.

River Forecast Centers (RFCs)

RFCs provide hydrologic forecasts and guidance information in three major categories:

- Mainstem river and flood forecasts for conditions at approximately 3000 locations with lead times ranging from six hours to several days;
- Flash flood and headwater guidance to WFOs for warning services involving small drainage basins with response times under six hours; and
- Long-term, seasonal forecasts providing estimates of snowmelt and water supply outlooks (from excess to drought) at approximately 1000 locations for periods up to several months in advance.

In the 1990s, the operations of RFCs are expected to change in a number of important ways. Each of the 13 RFCs will be colocated with a WFO. This will result in a more effective utilization of hydrological and meteorological information facilitated by a Hydrologic Analysis and Support Group in each colocated facility. It will also result in cost savings through shared facilities and through on-site exchange of data and information. Flash flood procedures will be more sophisticated resulting in more frequent updates of guidance and information for use by WFOs.

The basic river and flood forecasts produced by the RFC for specific locations along mainstem rivers are sent to WFOs as a basis for flood warnings to the public. Historically, RFCs have operated on one forecast cycle per day, based upon manual observations taken early each morning. To keep pace with changing weather and soil moisture conditions, assimilated data from automated data collection networks and NEXRAD, and to provide quality control, RFCs will operate an average of 16 hours-per-day. RFC operations will expand to 24 hours during periods of flood threat and with seasonal peak work loads. RFCs will produce hydrologic forecasts

as frequently as every six hours, based upon additional data and improved forecast procedures. AWIPS will assist hydrologists in the RFCs through data collection and processing, hydrological model execution, product formatting, and product dissemination.

National Meteorological Center

The National Meteorological Center has the responsibility for national and international data collection. This data base is first employed for global atmospheric and oceanic analysis. The resultant analysis products are distributed to international and domestic users which include the NWS, other government agencies, and private sector meteorologists. The data base is then used as initial input to global atmospheric numerical models. These models produce international aviation forecast products, high seas forecast products, long range national forecast, and forecast guidance for local WFOs and RFCs. New dedicated Class VII computer capabilities will enable increases in the resolution of the models resulting in improved forecast products and guidance. Traditionally the long range national forecasts have begun at 3–4 days and beyond. The new computers will reduce this threshold to beyond 36 hours. This will allow local forecasters to devote their attention to short-term weather events that are not amenable to centralized model solutions.

Climate Analysis Center

The Climate Analysis Center is a specialized center established in support of the National Climate Program Act. The Climate Analysis Center is part of the National Meteorological Center and is colocated with it to take advantage of the data, computers, and scientific expertise available there. The Climate Analysis Center's responsibilities are national and international in scope, related to overall goals of the United States Climate Program and are not directly affected by the NWS field reorganization. The Climate Analysis Center collects, organizes and disseminates climate information for diagnosis of short-term climate change; conducts and supports research on the physical cause of short-term (monthly, seasonal and interannual) climate change; and issues forecasts of weekly, monthly, and seasonal departures of average weather conditions from climatological means.

National Hurricane Center

The National Hurricane Center will continue to be responsible for the analysis, prediction, and tracking of tropical weather systems, their development into tropical storms and hurricanes, and larger scale disaster preparedness and coordination. Geostationary meteorological satellites will track and monitor tropical storms 24 hours-per-day throughout their entire life cycle. Coastal NEXRADs will provide the opportunity to examine tropical storms and hurricanes as they approach land, to an extent never before possible. New dedicated Class VII computer capabilities located at the National Meteorological Center will run new hurricane models which will provide improved hurricane forecast guidance to highly specialized tropical and hurricane forecasters located at the National Hurricane Center. AWIPS at the National Hurricane Center will integrate data, improve storm identification and tracking, improve dissemination of vital information to the NWS and external users, and allow more efficient use of personnel.

National Severe Storms Forecast Center

In the 1990s, the National Severe Storms Forecast Center will provide national severe weather guidance to WFOs and RFCs. It will issue more timely and specific mesoscale guidance necessary to support the severe weather and flood warning activities of the WFOs. It will develop new guidance products based upon National Meteorological Center mesoscale model output and new mesoscale data. It will continue to produce special hazardous weather forecasts and forecast guidance for domestic aviation users under interagency agreement with the Federal Aviation Administration. All of these activities depend on the new observing systems (NEXRAD, ASOS and geostationary meteorological satellites), on AWIPS, and on the improved guidance from the National Meteorological Center Class VII computer capabilities.

National Data Buoy Center

The National Data Buoy Center will continue the operation of deep sea, coastal buoys, and headland systems. Data from these buoys and these coastal systems are essential to marine warnings and forecasts, and numerical weather predictions.

Staffing

The new observing and data processing and display systems will provide forecasters the opportunity to sample, observe, and analyze the environment to an extent never before possible. The related ex-

pansion of the sciences of meteorology and hydrology will directly translate into improved service capability while simultaneously allowing greater efficiencies. Future field offices will have a core staff of professional scientists at each WFO and RFC to take advantage of these new capabilities. These individuals will be charged to provide all warning and forecast services across their area of responsibility. They will meet these tasks with the ability to evaluate vast amounts of integrated data, analyze the processes and events which will affect their area, and apply their scientific and technical expertise in a broad spectrum of immediate decisions. These will translate into a flow of service products, warnings, forecasts and advisories, that will be based on, and contain increased detail for all parts of the area.

Meteorological technicians will require different skills to support the new technologies, and more demanding, and increasingly sophisticated operations. System maintenance requirements will also place increased demands on electronic technicians who will require advanced training to support and maintain a variety of complex equipment.

A Meteorologist-in-Charge will have responsibility for each WFO. WFOs will operate 24 hours-per-day. The staffing level will be determined by peak service demands and maximum weather activity, with reduced staff requirements at selected offices during hours of lower threat and service demands. The support staff in each WFO will include positions providing critical program and maintenance support to ensure efficient operations and for the practice of advanced applied science. The public hydrologic warning, forecast and information programs of each WFO will be managed and supported by Service Hydrologists strategically located at selected WFOs throughout the Nation. At each of the 13 colocated WFO/RFC facilities, a Hydrologist-in-Charge will have responsibility for the RFC, including the Hydrometeorological Analysis and Support Group. Hydrologists and hydrometeorologists will maintain non-real-time operational support functions, as well as provide hydrometeorological support to the multiple WFOs within the RFC's area of responsibility. Staffing levels at the RFCs will be sufficient to maintain forecast services, nominally 16 hours-per-day, with variations attuned to each RFC's hydro-climatology and seasonal distribution of flood threats.

Implementation

The NWS has never undertaken a systematic modernization and associated restructuring effort of the magnitude presented in this Strategic Plan. Accomplishing the transition from today's operation to the modernized and restructured NWS of the 1990s, without disrupting ongoing services, will be a complicated process. Application of the new science, enhancement of the workforce, deployment of the new technology, and restructuring of field offices will mean that virtually every NWS activity will change in some way during the next eight years.

Management of this transition will be a complex effort, involving every level of the NWS. Accordingly, the NWS has established a Transition Program Office to provide an organizational focus for the entire transition process. The Transition Program Office will draw upon the technical staff resources of the NWS Headquarters, regional offices and field stations to prepare the plans necessary for the NWS modernization and associated restructuring. Once these plans are prepared, the Transition Program Office will manage the implementation.

Strategic Plan	Fundamental Goals and Objectives
National Implementation Plan	General Strategies for Accomplishing the Transition & Implementation Details
Regional Transition Plan	Realignment of Operational Responsibilities
Site Implementation Plan	Specific, Detailed Actions and Schedules for Each Site

Implementation Planning

Transition Planning

Transition plans will be placed in a tiered structure, with the Strategic Plan as the top level plan. The second tier, the National Implementation Plan, will be a broad guidance document supported by more detailed transition planning and implementation activities carried on throughout the entire agency. The National Implementation Plan will provide a planning framework and general strategies for accomplishing the transition, and establish basic transition management principles that will be used throughout the entire transition period in fulfilling the fundamental goals and objectives in the Strategic Plan. The National Implementation Plan will be updated annually and used to provide the Executive Branch, Congress, cooperating agencies, users, and the public with an overview of what modernization and associated restructuring is, how and when NWS will accomplish the transition, and progress reports on implementation.

The third planning tier, the Regional Transition Plans, will provide management flexibility and recognize both the decentralized nature of the agency's and the NWS Regions' responsiblity to maintain ongoing operations throughout the transition period. These plans, intended for internal use, will set a course that will ultimately achieve the modernization and associated restructuring goals and objectives within each Region, while taking into account unique conditions at each site, such as weather variations and user needs. Each Regional office will have the lead responsibility for preparation of their Regional Transition Plan, consistent with national policy.

The final planning tier, Site Implementation Plans, will contain specific, detailed actions and schedules for accomplishment. A separate Site Implementation Plan will be prepared for each WFO or WFO/RFC, and will address transition of all sites in its area of responsibility. Each Regional office will be responsible for the development and integration of Site Implementation Plans, with the support of the area managers.

The changes in operations and services related to modernization and associated restructuring will ultimately guide the transition. Future operations and services define the system outputs, the staffing type and mix of an office, and the field structure needed to efficiently provide these services. These, in turn, set requirements for training and education, facility preparation, and guide a number of other dimensions of the modernization and associated restructuring. A realistic view of technological capabilities, resource availability and

schedules, and the NWS environment will help shape the scope and pace of service changes.

The breadth of future operations and services is bounded by the agency mission and scientific and technological capability. Transition planning will recognize and incorporate these factors, and retain sufficient flexibility to respond to these dynamics. The NWS will plan and maintain a steady and predictable pace for implementation to allow sufficient time for orderly change and adjustment, both internally and externally, and to accommodate and capitalize upon the new knowledge and understanding acquired throughout the transition period.

Demonstration and Certification

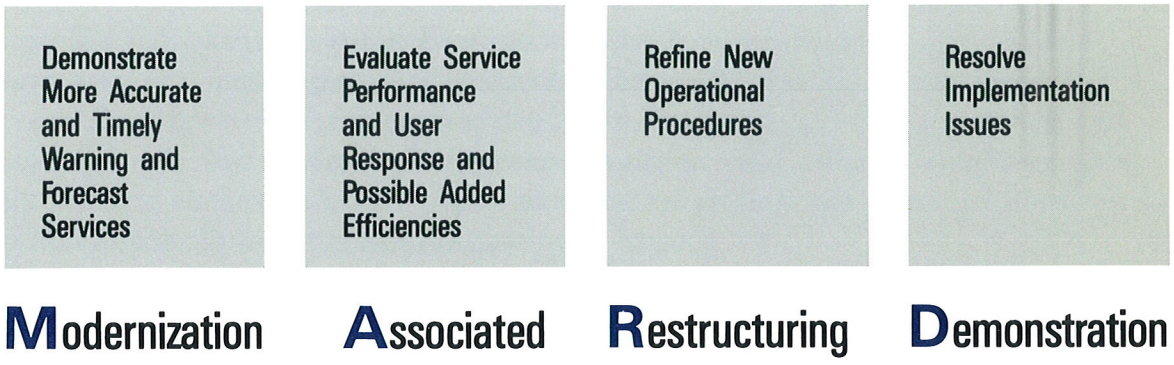
The modernization and associated restructuring of NWS features improved services through the effective and efficient use of the new technology. Aspects of this objective imply significant change both internally and externally. Active participation by NWS employees and external users is imperative for a successful transition. Support will be sought by informing them in advance of what changes are planned and why these changes are needed. Clear demonstrations of the service improvements that will result from these changes are a critical element in obtaining NWS employee and external user acceptance.

Demonstrations of new capabilities and services will take place through a wide range of activities. The Modernization and Associated Restructuring Demonstration (MARD) will be the centerpiece for demonstrating the fully modernized and restructured NWS of the 1990s. As currently planned, MARD will take place in a multi-state area in the central United States which is extremely prone to severe weather. Once the proper number and mix of staff is in place along with the new technology, and training has been completed, a number of WFOs supported by RFCs and National Centers will operate in the modernized and restructured mode as the first step towards national conversion to the new structure.

The primary objectives of MARD are to demonstrate more accurate and timely warning and forecast services and to provide an opportunity to evaluate service performance and responses of users within the context of the most cost-effective organizational structure.

MARD will help refine new operational procedures and resolve implementation issues that can best be addressed through actual field experience. MARD will also provide an opportunity to examine additional organizational efficiencies that may be gained from application of the new science and operation of the new technology, such as a 2-tier field office structure with reduced staffing at some offices.

Based upon the MARD experience, full implementation of modernized and restructured operations will proceed on a national basis in compliance with the provisions of Public Law 100–685. During national conversion to the new structure, existing weather service offices would be closed, consolidated, automated or relocated only when such action can be certified to result in no degradation of services to the affected area.



Implementation Schedule

Programs to acquire the new technology have been approved, and acquisition is underway. Developmental efforts to simulate the Weather Forecast Office of the 1990s have been undertaken since the late 1970s at NOAA's Environmental Research Laboratories as part of the Program for Regional Observing and Forecasting Services. Planning for application of the new science, transformation of the workforce, and the deployment of the new technology has been started. In a broad outline, the implementation schedule for modernization and associated restructuring of the NWS will consist of activities bracketed in time between now and MARD that must be accomplished in preparation for the demonstration, the Modernization and Associated Restructuring Demonstration itself, and implemen-

tation of full modernized and restructured operations after MARD. Field preparatory and risk reduction activities requiring long lead times to complete have already begun, and are scheduled to ensure their timely completion.

Experimental Systems

Additional work is underway on other technologies, though technically not now a part of the modernization program. As the research community continues development of experimental systems to improve observational techniques or improve operating efficiencies, demonstration networks may be deployed at specialized operational sites to establish and validate the utility of the new data or improved system. These centers of excellence provide unique opportunities for the research and operational communities to jointly assess and improve the operational utility of the new scientific innovations.

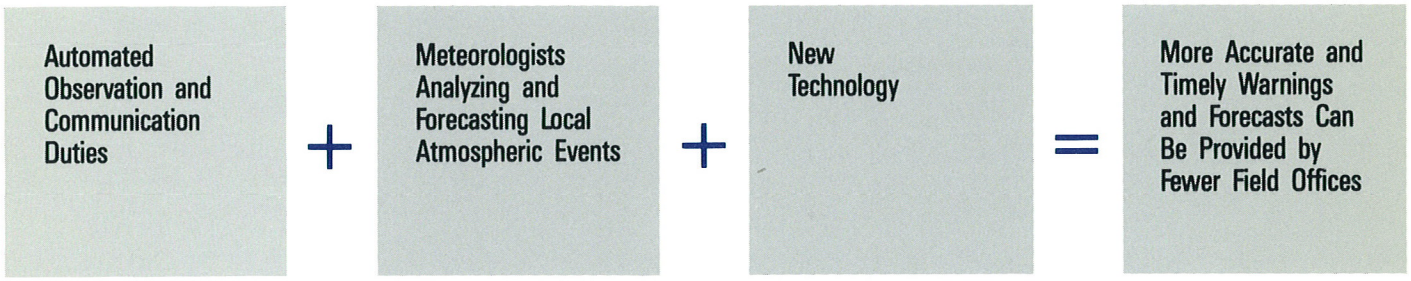
A demonstration project is underway that will deploy a new ground-based atmospheric sounding system, the wind profiler. This system will provide data on atmospheric winds with time and height resolutions not economically available with alternative techniques. Research is also continuing on thermo-dynamic profilers that may ultimately make important improvements in the acquisition of moisture and temperature information and lower the operating costs of today's upper air program.

Productivity and Efficiency Advantages

In designing the modernized and restructured NWS as a complete system, as opposed to the current system, which has evolved sporadically throughout the agency's history, improvements in services can be combined with productivity and efficiency gains by deliberate design of the new NWS.

Productivity and service improvements will be achieved by automating observation and communication duties, freeing trained professionals to concentrate on the highest operational priority—analyzing and forecasting local atmospheric events. Because the data available from the precisely organized satellite, surface observing systems, and Doppler radar networks can be processed and manipulated by tomorrow's meteorologists, more accurate and timely warnings and forecasts can be provided by fewer field offices. Using more data with fewer offices and a core of professional personnel translates into higher productivity.

The productivity gains acquired with the professional workforce, new science, and advanced technologies, in turn, mean operational efficiency gains. That is, lower costs associated with delivering more accurate and timely warning and forecast services are accomplished while concurrently increasing the benefits from more timely, pertinent information. The efficiency gains, once achieved, are a direct product of the entire operational design of the modernized structure.



Productivity and Efficiency Advantages

Meeting the Challenge of the 1990s

Understanding and predicting weather, climate and the state of the Nation's rivers has never been more important to the people of the United States and the world. Major advances in technologies, scientific understanding of the atmosphere, and in the prediction of the localized, most severe storms are within reach. While the resources to achieve the goals set forth in this Strategic Plan are significant, they pale compared to the savings of lives and property attainable through the modernization and associated restructuring of the National Weather Service. The challenge of the modernization and associated restructuring is to configure the NWS field offices, implement the new systems and networks, and professionalize the NWS workforce, without diminishing ongoing operations.

This document summarizes the opportunities and challenges that the Nation faces in modernizing and restructuring its capability to detect, understand, and predict our atmosphere. The discussion focused on the new scientific concepts that foretell significant advances in meteorology and hydrology. It considered the technology available to effect these advances and scientific concepts—automated surface observations, Doppler radars, satellites, supercomputers, and advanced information processing technology.

The people, the new technology, and the new ideas at hand combine to offer unprecedented advances in hydrometeorological prediction and in understanding climate change.

Department of Commerce
National Oceanic and Atmospheric Administration
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